WE CLAIM AS OUR INVENTION:

1. A heart stimulator comprising:

a stimulation pulse generator that emits stimulation pulses adapted to stimulate a heart of a patient;

an impedance measuring unit having at least two measurement electrodes, and adapted to measure an impedance between said at least two measurement electrodes resulting from volume changes of at least one left chamber of a heart of the patient, said impedance measuring unit emitting an impedance signal corresponding to said impedance;

a calculation unit supplied with said impedance signal for calculating, for a predetermined pattern of said stimulation pulses, an average impedance morphology curve from said impedance signal during a time interval of a plurality of cardiac cycles of the heart; and

an analyzer supplied with said average impedance morphology curve for analyzing said average impedance morphology curve to generate a control signal for emission of said stimulation pulses to optimize hemodynamics of the patient.

2. A heart stimulator as claimed in claim 1 wherein said impedance measurement unit measures a real part and an imaginary part of said impedance, and wherein said calculation unit calculates average values of said real part and average values of said imaginary part over said plurality of cardiac cycles for controlling emission of said stimulation pulses.

3. A heart stimulator as claimed in claim 2 wherein said impedance measurement unit comprises a synchronous demodulator for generating said real part and said imaginary part of said impedance.

4. A heart stimulator as claimed in claim 2 wherein said impedance measuring unit determines an impedance phase angle from said real part and said imaginary part, and wherein said analyzer analyzes said phase angle to detect insipient congestive heart failure.

5. A heart stimulator as claimed in claim 1 wherein said analyzer analyzes at least one predetermined parameter of said average impedance morphology curve for controlling emission of said stimulation pulses.

6. A heart stimulator as claimed in claim 1 wherein said impedance measuring unit samples said impedance with a frequency allowing impedance variations during a cardiac cycle to be followed.

7. A heart stimulator as claimed in claim 1 wherein said analyzer analyzes at least one predetermined parameter of said average morphology curve selected from the group consisting of integrated area below said average morphology curve versus time, a maximum value of said average morphology curve, a minimum value of said average impedance morphology curve, a difference between a maximum value and a minimum value of said average impedance morphology curve, a maximum positive slope of said average impedance morphology curve, a maximum negative slope of said average impedance morphology curve, a time between a maximum of said average impedance morphology curve and a predetermined beginning of a cardiac cycle, and a time between a maximum of said average impedance morphology curve and a predetermined end of a cardiac cycle.

8. A stimulator as claimed in claim 1 comprising a control unit connected to said analyzer for controlling emission of said stimulation pulses to optimize said at least one parameter with regard to said hemodynamics of the patient.

9. A heart stimulator as claimed in claim 8 wherein said analyzer analyzes an integrated area below said average impedance morphology curve versus time, as said at least one parameter, and wherein said control unit controls the emission of said stimulation pulses to maximize said integrated area.

10. A heart stimulator as claimed in claim 1 wherein said analyzer analyzes a plurality of predetermined parameters of said average impedance morphology curve, and wherein said heart stimulator comprises a control unit connected to said analyzer for controlling emission of the stimulation pulses based on a combination of the predetermined parameters analyzed by said analyzer.

11. A heart stimulator as claimed in claim 1 wherein said analyzer analyzes at least one predetermined parameter of said average impedance morphology curve, and wherein said heart stimulator comprises an electrode arrangement connected to said stimulation pulse generator and adapted to interact with the heart to stimulate the heart at multiple sites with a stimulation timing pattern, and a control unit connected to said analyzer for controlling said stimulation timing pattern to optimize said at least one of said predetermined parameters with regard to the hemodynamics of the patient.

12. A heart stimulator as claimed in claim 11 wherein said stimulation timing pattern includes a VV-internal, an AV-interval and AA-interval, and wherein said control unit executes an optimization procedure comprising varying said vv-interval while keeping said AV-interval and said AA interval constant until first optimum hemodynamics are obtained, and keeping said VV value at a constant value for which said first optimum hemodynamics were obtained while also keeping said AA-interval constant while varying said AV-interval until second optimum hemodynamics are obtained, and keeping said AV-interval at a constant value for

which said second hemodynamics were obtained and keeping said VV value at said constant value at which said first optimum hemodynamics were obtained while varying said AA-interval until third optimum hemodynamics are obtained, and keeping said AA-interval at a constant value for which said third optimum hemodynamics were obtained while keeping said AV-interval at said constant value at which said second optimum hemodynamics were obtained while varying said VV-interval until fourth optimum hemodynamics are obtained, and wherein said control unit repeats said optimization procedure until no optimum hemodynamic improvement occurs.

13. A heart stimulator as claimed in claim 11 wherein said control unit controls said stimulation-timing pattern by varying a stimulation rate.

14. A heart stimulator as claimed in claim 1 comprising stimulation electrodes, connected to said stimulation pulse generator and adapted for interaction with the patient to stimulate the heart, said stimulation electrodes forming said measurement electrodes of said impedance measurement unit.

15. A heart stimulator as claimed in claim 14 wherein said stimulation electrodes include an electrode designed for implantation in a right atrium of the heart and an electrode designed for implantation in a left atrium of the heart.

16. A heart stimulator as claimed in claim 14 wherein said stimulation electrodes include an electrode designed for implantation in a right atrium of the heart and an electrode designed for implantation in a left ventricle of the heart.

17. A heart stimulator as claimed in claim 14 comprising a stimulator housing containing said impedance measurement unit, said stimulation pulse generator, said calculation unit and said analyzer, and wherein one of said stimulation electrodes, which also forms one of said measurement electrodes, is

designed for implantation in a left atrium of the heart, and wherein another of said measurement electrodes is comprised of a portion of said stimulator housing.

18. A heart stimulator as claimed in claim 14 wherein said stimulation electrodes which form said measurement electrodes include an electrode designed for implantation in a left atrium of the heart and an electrode formed by a portion of said stimulator housing.

19. A heart stimulator as claimed in claim 14 wherein said stimulation electrodes which form said measurement electrodes include an electrode design for implantation in a left atrium of the heart and an electrode design for implantation in a left ventricle of the heart, and an electrode designed for implantation in a coronary vein associated with the heart.